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AUTHOR Rockman, Saul; And Others
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ABSTRACT

This research assesses the impact of the AB 803 Adoption/Expansion Program, a grant program that encourages schools to startup or expand their use of educational technology. The report summarizes how various grant programs have been prepared and how funds were applied at schools. The report also identifies factors that enhance or inhibit use of these funds; describes the impact of these grant dollars on schools, teachers, and administrators; and recommends new legislation to improve this grant program's design and implementation. From interviews with teachers and administrators in 35 California schools, researchers concluded that: (1) adoption/expansion grants promoted school-level planning for, and implementation of, educational technology; (2) school-site efforts were designed to meet locally defined needs; (3) small grants resulted in small-scale startup efforts or modest expansions; (4) some schools were able to leverage other fiscal resources; and (5) schools did not adopt model technology programs from other schools. The grant program encouraged decentralized decision-making and increased teacher and administrator control over the design and implementation of programs to incorporate appropriate technology in schools. However, the program's low visibility and the lack of school-collected data continues to limit public awareness of this program and its benefits. Recommendations for further enabling legislation are provided. Appendices illustrating samples and procedures and "stories from the field" are included. (MLH)

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POWERFUL AND EMPOWERING

(BUT ALMOST INVISIBLE)

Research on the Impact of the AB 803 Adoption/Expansion Program

December, 1987

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1855 FOLSOM STREET · SAN FRANCISCO, CALIFORNIA 94103 · (415) 565-3000

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POWERFUL AND EMPOWERING

(BUT ALMOST INVISIBLE)

Research on the Impact of the AB 803 Adoption/Expansion Program

by

Saul Rockman
Kayla Kirsch
John Mergendoller

with
Linda Nelson
Carolyn Brown
Joanne Splivalo

December, 1987

Powerful and Empowering (but almost invisible):
Research on the Impact of the AB 803 Adoption/Expansion Program

Executive Summary

The goal of this research conducted by Far West Laboratory is to assess the impact and recommend improvements in the design of a grant-giving program that encourages schools to start-up or expand their use of educational technology. The report summarizes the variety of ways that AB 803 adoption/expansion grants have been prepared, and how the funds were applied at schools. It identifies and describes factors that enhance or inhibit the utilization of these grant funds. The report also describes the impacts of these grant dollars on schools, teachers, and administrators. The report concludes with recommendations for new legislation that can improve the way this grant program is designed and implemented.

In visits to schools and interviews with school teachers and administrators in 35 schools throughout California, we found a great deal of activity stimulated by the AB 803 adoption/expansion program. We observed a range in the levels of program implementation and impact, variations influenced by school and district committment to the use of technology and the maturity of the programs that schools had implemented. Based on the legislative intent and language of AB 803 and on the goals specified by the Department of Education in the adoption/expansion program application guidelines, we conclude that:

- adoption/expansion grants promoted school-level planning for and implementation of educational technology;
- local, school-site efforts were designed to meet locally defined needs;
- small grants resulted in small scale start-up efforts or modest expansion of existing technology programs;
- in some instances, and in a variety of ways, schools were able to leverage other fiscal resources; and
- schools did not adopt model technology programs from other schools.

The intent of the AB 803 program clearly focuses on local empowerment and encourages decentralized decision-making. Schools needed to make their site's technology proposal consonant with their district's technology plan, but this was a formality in most cases. The schools, themselves, were able to determine the best application of these -- and other -- funds from the district and the state that related to technology. In order to do this, schools had to clarify their goals for the program, analyze effective approaches to implementation and develop clear planning procedures. That schools began thinking seriously about the appropriate uses of technology may be one of the more significant benefits of the adoption/expansion effort.

The AB 803 adoption/expansion program was a powerful treatment in the schools, with a variety of important impacts. It empowered many teachers and administrators in schools and increased their control over the design and implementation of a program to incorporate technology in their school. In the context of policy-making and the creation of new legislation, we believe the process of good planning to be more important than increasing the number of computers in schools.

(more)

Nevertheless, its low visibility, and the schools' inability or unwillingness to collect data to affirm what they say they see, continues to limit the public awareness of this program and its impact.

The Sunset provision of AB 803 is in place, and for the planning of new legislation that revise and refine the small-grant program, we make a series of recommendations.

- That a school-level grant program be maintained in new legislation.
- That it remain competitive and not become an entitlement.
- That the application process be improved.
- That unfunded schools receive increased technical support for their applications.
- That the staff development component be emphasized.
- That multiple applications be permitted from smaller units within schools.
- That the competitive process use successful grant applicants as judges.
- That the "small" grant nature of the program be continued.
- That support for ongoing costs be considered in the district match.
- That both school-level and third-party evaluations be conducted to assess program impacts.

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It was a turning point for our school and for the district. Without AB 803, it would have taken ten years to get where we have gotten in only two. AB 803 really made a radical difference.

Computer mentor teacher

Powerful and Empowering (but almost invisible):

Research on the Impact of the AB 803 Adoption/Expansion Program

Introduction

The goal of this research conducted by Far West Laboratory is to assess the impact of and recommend improvements in the design of a grant-giving program that encourages schools to start-up or expand their use of educational technology. The report that follows summarizes the variety of ways that AB 803 adoption/expansion grants have been prepared, and how the funds were applied at schools. It identifies and describes factors that enhance or inhibit the utilization of these grant funds. The report also describes the impacts of these grant dollars on schools, teachers, and administrators. The report concludes with recommendations for new legislation that can improve the way this grant program is implemented.

At the request of the Department in the fall of 1987, Far West Laboratory investigated the manner in which a variety of schools planned and implemented programs using AB 803 adoption/expansion grant funds. In visits to schools and interviews with teachers and administrators, we found a great deal of activity stimulated by the AB 803 adoption/expansion program. We observed a range in the levels of program implementation and impact, variations influenced by school and district committment to the use of technology and the maturity of the programs that schools had implemented. Based on the legislative intent and language of AB 803 and on the goals specified by the Department of Education in the adoption/expansion program application guidelines, we conclude:

- adoption/expansion grants promoted school-level planning for and implementation of educational technology;
- local, school-site efforts were designed to meet locally defined needs;
- small grants resulted in small scale start-up efforts or modest expansion of existing technology programs;
- in some instances, and in a variety of ways, schools were able to leverage other fiscal resources; and
- schools did not adopt model technology programs from other schools.

The AB 803 adoption/expansion effort is not a high profile program compared to other more visible AB 803-funded initiatives. It is perceived by teachers and administrators, however, to have powerful effects at school sites. It also promotes local decision-

making and empowers school staff to implement programs that meet their needs. The grant program also encourages thoughtful planning efforts regarding the use of technology. The relative invisibility of this program is due, in part, to the lack of data gathered by the schools on the effects of the technology program on students and schools.

The Sunset provision of AB 803 is in place and new legislation is being planned for introduction during the coming year. At present, there are opportunities to redefine and/or refine the adoption/expansion program.

For this report, the word "technology" encompasses computers, television and other educational technologies present in schools. They are all recognized in the language of the AB 803 legislation and in the application form used for funding the program.

Background

California's Educational Technology Local Assistance Program (authorized under Assembly Bill 803) has, among its varied activities, a district-matching grant program that has supported and promoted technology in schools. This grant program provides a ten-to-one match for LEA funds and, through fiscal 1987, these grants provided an aggregated $38.9 million to 52% of California's schools. [For the 1987 fiscal year, the total has reached $47 million in grants to 66% of the state's schools.] As designed by the Educational Technology Committee and administered through the Office of Educational Technology, the program has provided grants to individual school buildings to advance technology programs. This "adoption/ expansion" program, was designed with the following purposes:

> • To promote school level planning for and implementation of educational technology programs which meet the learning needs of students as determined by teachers, administrators, and parents in that school's community;
> • To support relatively small-scale start-up or expansion efforts that are developed in concert with other resources in the school (school improvement, staff development, mentor teachers, classroom teacher mini-grants, ECIA Chapter II, etc.);
> • To encourage all districts to consider adopting an existing effective educational technology "model" program which is closely related to the needs and priorities of the applicant's school.
>
> (Cycle IV Application Guidelines)

The adoption/expansion program also has to meet the legislative intent of AB 803 which includes the need to:

> • be responsive to the changing educational needs of California's population;
> • promote educational programs designed to strengthen students' reading, math, science, and technological skills;
> • ensure equitable access to such programs for all students;
> • involve the business community in programs where that involvement would serve to enhance the responsiveness of technological education to the needs of students.
>
> (Cycle IV Application Guidelines)

There have been four annual competitions for AB 803 adoption/expansion funds, managed on a regional basis by the Teacher Education and Computer Centers (TECC).

California elementary and secondary schools were able to receive grants of $8,000-24,000[1] that were then matched by a minimum of one dollar from the districts for every ten dollars from this program. The fourth cycle of grant applications was undertaken to obtain fiscal 1988 funds; however, the governor's cutbacks in educational funding reduced by approximately one-half the amount of money allocated to the support of the adoption/ expansion grants. About half of the schools whose applications met the criteria for funding will receive awards this year, with the remaining schools to receive money from next year's appropriation of technology funds.

Existing Evidence of Impact

There is evidence of the impact of this grant program on the availability and use of computer and video hardware in schools as reported in the AB 803 Sunset Report. The three cycles of funding have:

- reached a total of 4151 schools serving 2.7 million students, 59% of all elementary students and 70% of all secondary students;
- reduced the ratio of students/computer by 37% in funded elementary schools and by 21% in funded secondary schools;
- seen schools spend 71% of these grant dollars (more than $25 million) on computer hardware, 14% on software, 6.5% on instructional television, and most of the remaining 8% supporting staff development;
- focused attention on computers for the improvement of English/ language arts/ writing curriculum, as well as mathematics and computer science.

Beyond these gross statistics, we know little about how schools planned for the funds to enhance their technology program, whether they accomplished what they set out to do, and with what effects on the school, the curriculum, and the teachers and students at the site. Moreover, little information has been collected on the effects of these technology grants on the technology planning and operational instructional programs of participating schools. A study conducted in Los Angeles County on local AB 803 grants (Wulf, 1986) indicated the importance of staff development activities associated with the adoption of technology and variation in the effects of the AB 803 technology program in elementary and secondary settings.

Given the need to understand more about the school-level processes and impacts associated with the adoption/expansion program, FWL investigated the manner in which a variety of schools planned, implemented or expanded technology programs using AB 803 funds.

Grant programs designed to expand the instructional and pedagogical options available in schools will have a differential impact in different settings. Contextual factors, such as the support of the principal, building leadership, match with the curriculum, and broad teacher involvement are all known to lead to more or less successful adoption and utilization of technology and other educational innovations. Funds that are provided by a program such as AB 803 will sometimes serve as a catalyst for schools, encouraging

1. For the first two cycles, elementary schools were limited to $8,000 and secondary schools to $12,000. For the third cycle, a sliding population scale used these amounts as a base, with increases up to $24,000 for secondary schools with more than 3,000 students.

school improvement. Sometimes these monies will serve the goals of one teacher or one curriculum program. In a few schools, the monies will only increase the amount of equipment found in the storage closet. (Berman and McLaughlin, 1977)

Sample and Procedures

The Office of Educational Technology identified a sample of 37 schools, in three geographic regions that represent the variety and diversity found in California. The questions to be addressed were also developed in conjunction with the Office of Educational Technology.

Far West Laboratory researchers selected approximately one-half of the sample for on-site interviews with school staff (see Tables 1 and 2 in Appendix I). Information collected during these visits provided brief descriptions, snapshots, of the ways in which these schools applied the AB 803 adoption/ expansion dollars. The remaining sites served as a verification sample, a way of ensuring that what was noted at a few sites was also likely to be found elsewhere. FWL researchers conducted telephone interviews with school staff members knowledgable about the AB 803 activitiy in their school.

A review of the application forms indicate that these schools spent their AB 803 dollars in ways that match the overall spending patterns of funded California schools over the first three years of grants. While the sample is small, spending patterns do not differ greatly from the data reported in the Sunset Report. Most of the money -- almost 75% of the $400,000 these schools received -- was spent for computer equipment and furniture to house it. About 12% was devoted to software, 4% for video equipment and services and about 8% of the grant funds went for staff development.

This study used qualitative methods to gather information reliably and validly, identify the salient issues, explore them with staff at the school sites, and confirm them. Researchers developed rich, illustrative descriptions of school programs that received and implemented technology activities with funds from AB 803. These were compared with one another and common themes were identified. Some of these themes served as answers to the research questions posed earlier. Others represented unexpected findings. Further information about the procedures, can be found in Appendix I. For examples of the descriptions, see Appendix II.

Findings

As noted in the Introduction above, schools participating in the AB 803 adoption/expansion program undertook activities and met the implementation criteria that satisfy the legislative intent of the program. Further conclusions about the program, how it operates, and its effects on schools and people emerge from the site visit and interview data collected by Far West Laboratory. This information, elaborated below, expands the conclusions about the program's stated goals, illustrates examples of how the process worked, and leads to specific recommendations for revising and extending the adoption/ expansion program.

The following sections note general trends about the application of the adoption/expansion program in schools, describe the application process and its impact on program participants, and then consider the perceived outcomes of the activities conducted with grant funds received through AB 803.

General Trends

In general, the availability of small amounts of money was a strong stimulus for both teachers and administrators. Many of those people who initiated activities under AB 803 were "champions" of technology in their school -- people who had (or were willing to obtain) expertise, were highly motivated, had a vision of how schools could be improved, and who perservered under sometimes frustrating circumstances. When an administrator was the technology champion, and took the initiative alone, the result was often the acquisition of more computers for a lab and/or staff development for teachers. When the AB 803 activity was started by a computer champion from the instructional staff or a group of teachers, or if the administrator-champion was part of a team with instructional staff, the outcome was often a targeted, curriculum-focused activity. We frequently were told of instances when the AB 803 proposal writing and grant implementation served as a revitalizing factor, retaining teachers who would otherwise leave the profession.

Most of the technology activities we saw focused on computers; only two of the schools we visited incorporated significant amount of money for video activities in their AB 803 application. Nevertheless, all schools had both technologies in evidence. The school technology programs initiated or enlarged with these funds were designed to deal with locally-defined needs and usually involved the participation of parents, teachers and administrators to prepare the proposal and to implement the grant. Each school felt that its circumstances were unique and, while theoretically willing to adopt proven projects, in practice preferred to develop and implement something "home grown."

There were difficulties, to be sure. Often schools established plans and applications that were unrealistic or too ambitious at first and were initially rejected by readers at the TECCs. There were frequent bureaucratic barriers to the implementation of any plan, most often at the district, not the school. Computer champions reported that other teachers resisted using technology in their classes. Nevertheless, teachers and site administrators portrayed the adoption/expansion program as successful in almost every instance. It was popular with everyone; school staff often questioned researchers about how to obtain additional funds and gave out lists of what they wanted to buy with the new monies. The following vignette is illustrative:

> *The computer coordinator is a special person and had been involved with computers ever since he did his masters thesis on computers in education thirty years ago. After years in industry, writing proposals for engineering computer efforts, he joined the staff of a 1,500 student, high school in a rustic, rural suburb of a modest-sized city. When he heard about AB 803 adoption/expansion efforts, he immediately went to the district office to get their support. He attended TECC workshops and helped form both a district and a school committee to prepare proposals. (After this AB 803 activity, the district hired a full-time, computer coordinator to help schools with 803 and other computer activities.) While he felt it was time consuming, he had little difficulty writing the proposal on his own time.*

When the equipment arrived and was set up, he trained teachers and administrative staff in word processing, programming, and computer gradebooks in a series of one hour sessions. After about 20% of the staff had been trained, the remainder were gradually approached about learning and using the computers. Now, three years later, more than 80% of the teachers use computers for gradebooks or word processing, at a minimum.

The district was stimulated by the success of the first year's AB 803 efforts and began to "pour money" for technology into his school and others. For instance, several schools began replacing all the typewriters in business classes with computers and placing specialized labs into the science and mathematics departments. "It was a turning point for our school and for the district," he said. "Without AB 803, it would have taken ten years to get where we have gotten in only two. AB 803 really made a radical difference."

Application Process

Almost every writer of an AB 803 grant felt that proposal writing was tedious and that they spent more time on the task than they had initially planned. Some sites reported spending more than one hundred hours to prepare an application. Several of the proposal writers indicted that the general idea of what they wanted to accomplish with AB 803 funds never changed from their first, unsuccessful attempt to their third and winning proposal. The only changes were in how they expressed their idea, often improving the clarity and specificity of the local plan.

Some of the more frustrated, though ultimately successful, grant writers wished for an opportunity to express their idea in a narrative, in person, to someone who could make a decision as to its worth. "The way we were forced to say it didn't convey our vision."

The application form was backwards. The directions were unclear -- the school section came first, the district second, and it made little sense.

Computer coordinator

A few of the proposal writers mentioned that the experience gained in writing and rewriting AB 803 proposals, and in talking with skilled proposal writers, resulted in their learning how to write proposals. They reported several additional successes and indicated that they "wouldn't have had the confidence to apply" if it hadn't been for their AB 803 experience.

While the planning, proposal writing and application processes may have been a hurdle for many of the applicants, it was not insurmountable, as these successful applicants have demonstrated. Applying several times was frustrating, especially when little feedback was provided or applicants saw other schools receive awards with little time and effort invested. Nevertheless, the process of planning and preparing an application several times did, they report, improve the quality of the technology plan, and it had some positive psychological value for many of the teachers who succeeded in obtaining funds

for activities they thought important. In general, it appears the administrative burden was worthwhile because it stimulated the planning process. And careful planning was important to both the project's success and the personal satisfaction of the school personnel.

Several of the teachers and administrators we interviewed remarked on the reading of competitive applications conducted by the TECCs each year. They reported very different scores on essentially the same proposal over two cycles. From their perspective, the recruitment and training of large numbers of inexperienced proposal readers at the TECCs, combined with significant turnover of reviewers each year, may have reduced the reliability of the reading process. The reliability of the judges' scoring was questioned in each of the TECC areas we visited.

A large portion of applicants found it necessary to submit proposals several times before they received funds. These schools and others also sought assistance from a variety of agencies. Moreover, each school's application required information about its district technology plan. The following sections expand on these issues.

Repeated Applications

Most of the schools we visited that had received grants in the second and third cycles had applied for AB 803 adoption/expansion grants several times over the three years, 1984 through 1986. Some applied twice, some three times, before they obtained the AB 803 funds to conduct the work described in their proposals. This perseverance speaks to the sustained interest and motivation of the administrative and instructional staff; it reinforces the absolute need of the schools that had identified these monies to expand their technology programs; and it indicates the continued administrative support and encouragement that allowed teachers and others to spend their time on the application process.

> *It was definitely worth it. When you consider that our math budget is a box of chalk -- or seems like it -- this was our chance to make some capital outlay purchases.*
> High school mathematics chairman

Schools that made repeated attempts to obtain adoption/expansion grants also pointed to problems and frustrations. Some interested schools had great difficulty developing acceptable proposals -- some because their ideas were not well focused at first, and others because they did not know the "proper way" to write a proposal. More than a few of the school staff with whom we talked readily admitted that their first proposals were inadequate and poorly focused. Other problems and frustrations they cited were rather site-specific and included luck and local school district politics. In addition, schools felt that the competition for limited dollars was frustrating, especially when acceptable proposals could not be funded.

Seeking Help

Since most people writing AB 803 proposals had little experience in writing for grants, they sought help in a variety of ways, depending on the resources available to them. In one case, a principal volunteered to be a reader for AB 803 adoption/expansion

grants at his TECC. The knowledge he gained by seeing how others presented their plans led to a successful application in the following year. In other cases, teachers or administrators went to their district office to gain assistance from the district's "grant writer" or talked with friends or associates who had successfully applied for AB 803 or other grants. Most schools sent people to their TECC (or Foundation or Academy) for grant preparation workshops preparing for the second and third cycles. However, this strategy was not always successful. For example, some potential applicants were given incorrect information at TECC grantwriting workshops (e.g., the need to have an impact on *all* students with grant funds); this, in turn, influenced what they proposed and resulted in plans that did not reflect what the schools wanted to accomplish.

> *The head of the science department of a medium-size, suburban high school initiated the AB 803 application process in 1984 and, with the assistance of another teacher, put in more than one hundred hours at night and on Saturdays, to prepare the proposal. The application was rejected the first time. The following year, they joined with two other districts and hired a "grant consultant" to help them and "it was the worst proposal of all." The teacher had requested a modem to use on-line data bases in the first cycle, then took it out in the second cycle because the readers didn't know what it was. He received very little feedback on first two proposals. In fact, over the three-year period, he had attended every single TECC workshop offered on grant writing. He says he's not sure it helped him any; writing the two that were not funded helped him learn more.*
>
> *In the third cycle, he had others read the proposal. He had a friend who had read applications the previous year who told him what to include and what to leave out, and to make sure he said things like ". . . computer access for all students." He reports that the success had more to do with luck than with skill. "The first proposal was as good as the last. The whole process felt like a game or contest."*

Assistance from the district or the TECC was not universally available, nor were grant writers found at every district (or even county) office. In one urban area, the TECC AB 803 coordinator was credited with helping a two-time loser become a third-time winner, while in another urban area, the TECC staff was described as "less than helpful." Often informal help -- from friends, from the district, or from the TECC -- proved the most useful. One of the best aids, reported in several of the interviews, was someone in the TECC providing an opportunity to see winning proposals. A good "model" went a long way in encouraging school staff with the information they needed to revise their work and turn an inadequate proposal into a winning one.

> *"When people ask me how to write a proposal, I tell then to set a simple and realistic goal and have all activities leading to that goal."* She drew a pyramid to show her point.
>
> Field notes of interview with computer coordinator

District Plans

The adoption/expansion application procedure required applicants to report their district technology plan and demonstrate the consonance between the school-site plan and

the district technology goals. Having a district plan was important, some interviewees noted, because it formally confirmed the district's involvement with technology and identified a person or office for local assistance.

Nevertheless, in almost every case, the district plan was not useful in informing the school staff as to what they should propose for AB 803 funds. Nor did it provide "models" of what a school-site technology program might be like -- at least not in sufficient detail to use in a grant application. Since the technology need and the approach to meet it were derived from within the school, dealing with the district plan was seen as just one more hoop to jump through. Often, the school-site computer champion obtained the district plan only in order to summarize it for the proposal. Some districts duplicated summaries of their plans for schools to submit with their applications, and applications sometimes included addenda with different type-faces.

Perceived Impact

The small grants made available through AB 803 adoption/expansion program provided support for those schools and those individuals who were prepared to *do* something with technology. The money, though modest to many schools, was significant. Its availability was important to computer and video champions whether teacher or administrator. In some places, the entire school or a substantial portion of it seemed to be influenced by the resources or activities obtained as a result of AB 803 funds. In other places we visited or spoke with, only a department or a few teachers were affected, although the instruction within that part of the school's organization operated differently with technology. The grant had little substantive impact on the entire school; it did not lead to restructuring the school.

Variations in impact appeared to depend on how far the school had gone in the adoption process. There was a noticeable trend of starting out teaching computer literacy on a few computers and striving for the goal of establishing a computer lab. Once the lab was established and in use for school-wide computer literacy, then several teachers would start a pull-out program that sent students to the computer lab to accomplish specific curriculum assignments. This started schools moving towards the use of computers across the curriculum areas with hardware distributed across classrooms and departments. Some schools had a small number of computers in use prior to the AB 803 grant and had used this money to build a modest laboratory, often with significant district help. For these schools, at least in the early days of having their AB 803 equipment, computer literacy classes and drill-and-practice programs were common. This was consistent with the local plans described in the applications. In schools we visited and spoke with, at all grade levels, students were pulled out of their regular classes to spend time in the laboratory with remediation assignments prescribed by the teacher. In other places, where a school computer laboratory existed, or where specific curriculum departments had large numbers of computers available for their students, AB 803 money often went to provide individual classroom computers for a group of teachers, to permit another department within the larger school begin to use technology for their subject specialty, or to provide staff development for the teachers who desired it.

> *For a small school like ours, there doesn't seem to be any other source of funding. AB 803 enabled us to get what we couldn't have gotten anywhere else.*
>
> Elementary school teacher

In a very small universe, in limited settings -- a small school, a department, a few "computer-ready" teachers, or even one classroom teacher or lab instructor -- AB 803 was extremely important for a variety of reasons:

- it was a source of dollars at a time when resources were limited,
- it was a *raison d'etre* for some teachers on the edge of a burnout,
- it was leverage for a substantial site or district investment in equipment and/or staff development,
- it provided credibility and leadership opportunities to teachers already enthusiastic about computers, and
- it motivated individual teachers, and groups of teachers, to explore and experiment with technology.

Nevertheless, very few schools collected information that would describe the impact of the technology program and substantiate their meeting the objectives they set for themselves.

In the sections below, we discuss some of the impacts reported by teachers and administrators at the schools in our sample. Initially we look at the implementation itself; this is followed by reports of impacts on students, and on teachers and administrators. Finally we described the leveraging of other resources available to schools and the participation and contributions of business and industry and parent groups.

Fidelity with Proposal

Every school we visited and spoke with started out to do what they described in their application. Sites that received funds two or three years ago had implemented their plan, and tried it out for at least a year. Over time, many of them had modified their use of AB 803 equipment and made significant improvements in the use of technology.

> *One urban middle school assumed that it could purchase enough computers for a Language Arts lab, but district funds were not forthcoming. The computers were then put on carts and wheeled from one Language Arts classroom to another as teachers requested them. While this has been worthwhile for many teachers, there have been numerous maintenance problems as a result of connecting and disconnecting wires with such frequency. New funds over the past year finally permitted the purchase of additional computers and the formation of a laboratory.*

Other schools found that current staff and/or resources do not permit continuation of what had started with AB 803 funds. In some instances, the computer champions who started the program left for jobs at other schools or for district positions. They were sometimes replaced by new champions who had different ideas about the use of technology. In other schools, the reduction of other funds changed the nature of the program.

> *In a large rural elementary school, AB 803 funds were heavily matched by the district and a 13-station computer lab was set up. Using categorical funds, the school had hired a full-time lab teacher. Teachers would send one half of their class at a time to the lab for instruction on word processing, computer literacy or remedial instruction in math and grammar. This year the funds for the lab teacher were cut and, since one half a class can fit into the*

computer room, only those teachers with an aide can provide supervision in two places at the same time.

For many teachers, the solution was to involve parents in the program. Each teacher tried to get parents to serve as classroom aides for at least one day a week. Those who volunteered were given training on the computers and now serve as their classes computer lab instructor, following the directions set out by the regular classroom teachers. The parent will take half a class at a time to the computer laboratory for instruction.

Some of the more recent recipients were still trying to overcome bureaucratic barriers to accomplishing their initial goals.

One large urban high school had ordered computers for its language lab with AB 803 funds. The equipment had arrived over the summer when no one was available to receive it on site. It is now being shipped again. Some of the AB 803 money was to build carrels in the lab to house the computers, but since the district has a freeze on new construction (and that is how the carrels are defined), district carpenters cannot build them. The school is exploring how outside construction help can be obtained within the budget confines of the grant and the liability issues of the district.

At another school, we were told that the AB 803-funded program was behind schedule because the district had not set aside funds for the required 10:1 match.

Impact on Students

In every school we visited and spoke with, teachers and administrators were asked if computers had made a difference to their students. Unanimously, they reported that it had. The differences noted by these educators were in areas such as improved self-esteem, increased attention to tasks, greater interest in classwork and motivation to attend and succeed in school. There was a common belief, occasionally stated, that drill-and-practice programs increased time-on-task, and thus grades. It was a rare computer coordinator or school administrator that could even identify test score gains; even rarer was one who could produce data documenting these gains.

Anecdotal data from teachers and administrators identified success stories in special education (computer use was associated with increased time-on-task and with improved self esteem), ESL classes (computers provided opportunities to achieve success and improve language skills), gym class for disabled students (computers allowed students to play games that increased their fine motor coordination), and prevention of student dropouts. Data on these various outcomes were not collected by teachers or administrators. In some cases, we lack appropriate measurement techniques for the impacts. In others, no one thought to collect the data that were available to them.

A language arts teacher in a rural high school described working with her class of ESL students and sending them to the computer room to work on writing resumés and learn word processing at the same time. "When they saw what they had written, they were extremely proud." Their work was neat and accurate. These students also started keeping journals on the computer and using it for various kinds of language tasks.

The teacher reported higher scores on the ESL language proficiency tests and attributed the gain to the program initiated with AB 803 funds. The English department, after a taste of success with the AB 803 computers, had recently ordered enough of their own computers to establish a departmental computer lab. But, during the time it took to set up a laboratory room, the computers were placed one or two to a room and the teachers now refuse to give up "their" classroom computers. The department is now planning to use the new computer lab being set up in the library; in-class computers will remain where they are.

In the few instances where any school staff and administrators collected informal data on the use of technology, the information served to acknowledge and reinforce the worth of the school's overall effort to employ instructional technology, not specifically to evaluate the AB 803-funded activity or the achievement of students in the program. Any feedback for the computer champions was perceived as a significant reward for their work. Some of the schools we visited or called did have indications that the computers were being used more, or that a greater portion of the staff was trained and now engaged in some aspect of computer use.

It was difficult to find formal impact and outcome data collected by the schools. Although each applicant had to describe planned evaluation activities, there was little incentive or motivation for schools to undertake such an evaluation. Proposed evaluation designs often included monitoring student achievement gains and levels of student and/or teacher computer use and competence. In general, these plans were predicated on overly optimistic assumptions and were sometimes built around inappropriate methodologies (e.g., using CAP scores to assess computer proficiency). In practice, no significant summative evaluation was conducted.

Impact on Teachers and Administrators

In almost all of the schools we studied, some small portion of the AB 803 adoption/expansion grant was used to provide or enhance computer inservice and staff development. Most of the applications showed staff development as part of the district matching funds. Not all teachers or administrators enthusiastically embraced the new technology.

In an urban, heavily minority, high school, a computer mentor teacher experienced in grant writing headed the team preparing the 803 proposal. A school committee consisting of mathematics, special education, science and computer teachers prepared a proposal to use computers to increase students' English proficiency skills. No one from the English Department was on the committee, nor was the principal. Their first proposal was reviewed by the TECC and by the district office before submission and was successful. Now, a year after the computers have been received, the English lab is still not up. The principal was not too interested in the program and cancelled the inservice sessions several times and was also slow in preparing the special classroom for the computers. The computer teacher still hopes it will be successful.

As could be expected, some teachers who went through the staff development activities never went near a computer again. Others "caught the bug." Even the computer

champions reported that some of their associates did not find anything of value in computers and would not use them, or would use them only in limited and well specified ways. In some instances, teachers were lured by time-saving administrative programs (such as gradebooks and word processing for suspension letters). Once they became familiar with these programs, some progressed to considering and using computers as part of their classroom instructional strategies.

A few teachers noted that their teaching had changed as a result of having computers and other technologies available. Some were able to reach students they hadn't been able to in the past, and thus, used technology to enhance instruction for an isolated child. A few taught materials they could not have before the availability of computers in their school. Word processing and the improved appearance of assigned papers led several teachers to assign more writing; it was now easier for them to grade it.

> *A small urban high school that already had a substantial computer requirement for students and two computer labs sought AB 803 funds to provide computer inservice for all its staff and to acquire a large variety of software to pique the interest of each curriculum group. To get everyone started, the computer teachers introduced their collegues to a gradebook program. Now, two years later, while only 20% of teachers use the computer and its curriculum-focused materials for instructional purposes, almost one third of them use the gradebook. Some send students into the lab to do the work, others come themselves; but they all recognize the efficiency of being able to post new grades almost daily.*

Inservice on the computer provided limited instruction on the technology itself and, when well-planned, taught staff how to do word processing or to use classroom management packages. These were immediately useful and useable teacher skills. A more recently developed approach to computer inservice showed teachers how to integrate computers with their ongoing curriculum. One school we visited focused half of its AB 803 money on staff training and involved all teachers and most of the administrative staff. Several other schools reported that other staff development funds, especially from AB 551, were used in conjunction with AB 803 grants to provide inservice instruction to much of the school's teaching staff. Rarely were administrators or front office staff specifically trained with AB 803 funds.

For some teachers there was little incentive for inservice or followup on computers; they were at the top of their pay scale and had little time for computers in their class schedule. At the same time, we heard stories of other teachers who, on the verge of burnout, were revitalized by learning new skills associated with computer technology. We also found several teachers in their fifties, who had recently returned to the teaching profession and had become the computer champions in their schools.

Some of the schools we visited and called had listed TECC-supplied training as one of their budgeted activities. However, once they received the grant, they turned to the computer champions instead -- often one of the proposal writing team -- to conduct staff development. They felt that their staff members "would be around to help" during the coming years and that their accessibility would make it easier for other teachers to seek and receive help. This local resource was not always in the best interest of the school, according to a few respondents. In most cases, it appears to have worked well.

Leveraging other Resources

The AB 803 proposal application required a district match of ten percent. In more than half of the applications we reviewed, the match was limited to the ten percent and was usually personnel time and release time for inservice programs. In a few cases, especially in small districts, the district match provided two or three times the amount of the AB 803 grant. In some of these, the state dollars from AB 803 and district funds were being used to help fund a computer lab. In others, resources from the district or from other state funds (such as AB 551) were used to create a computer coordinator's position. But they were exceptions to the norm of the minimum match.

Adoption/expansion funds were often extended by a variety of local, state and federal sources. Teachers and administrators regularly mentioned the following programs as sources for equipment and staff development (in order of frequency of mentions): CTIIP, SIP, Mentor Teacher, district funds, Special Ed, ESL and bilingual, and Chapter 1 and 2. Which dollars were obtained and how the money was spent on technology depended a great deal on site-specific factors. For many of these funding sources, the amount of money for any one school or teacher was even smaller than the AB 803 grants. These other funding sources were used to expand incrementally the technology program in schools. At any one school site, one or more of these programs would be tapped for specific assistance and the source of additional technology money could change from year to year. While these funds were used for enhancing the school's technology program, rarely were they formally acknowledged in the AB 803 proposal or in the specific activity funded by the adoption/expansion program.

It is almost impossible to trace the funding of the technology programs in a school. It is even more difficult to relate these funds to the impact of the program in the classroom and on the teaching staff. Rather than unravel costs, we believe that research should begin to consider the notion of investment when attempting to understand the impact and value of a complex educational program, such as this technology effort. The 37 schools we studied reported investing almost $400,000 of the state's money for technology programs; they stated that they added one-third more by their match (about $135,000). After numerous discussions with teachers and administrators, we believe that this figure minimizes the investment of district funds and the cost of time of many individuals who worked without pay.

Many of the people with whom we talked reported spending large amounts of unrecompensed time in the preparation of proposals, the installation of equipment, the training of others, and the implementation of the AB 803-initiated technology program. Furthermore, these people often went out of their way to take classes, attend workshops, and obtain training that improved their skills and often increased their salary. Schools and districts, too, applied resources to the implementation of the technology program that did not get mentioned in the application or that were incurred following the installation of the equipment. These costs included modifications of the physical space that housed the computers, the unplanned-for training of secretarial staff and the purchase of computers for administrative purposes. The calculation of these unreported, yet matching, funds is well beyond the scope of this study.

After the 803 grant, we got some computer funds from the PTA and then we became a SIP school and we used that to enhance the computer center and provide some staff for it. When we applied for AB 803 we were not a SIP school; the only money was a lump sum allocation from the district General Fund -- no Chapter I, nothing -- no other source of income. So the 803 grant was very important.

Middle School Principal

Community and Business and Industry Support

There was very little to connect business and industry support to the AB 803 grant. We found no case where funds from outside of education were used specifically to extend the activity started by AB 803 funds. This does not mean that business and industry did not support activities in the schools, nor that they did not support technology in the schools. There were numerous instances of each of these links between the schools and the community. None, however, related directly to AB 803.

In previous years, business and industry had funded many programs, especially in the high schools and in urban areas. Some portion of these efforts had been in technology; and in at least one case, an entire computer lab had been installed through industry support. Teachers at several schools mentioned that they had sought support from local industry in connection with their AB 803 plan, but none had been forthcoming. Staff at a half dozen schools mentioned that they had approached computer vendors and local industries for additional money and/or equipment, but had been turned down. Others stated that they planned to tap business and industry support, but had not yet had the time to do it.

Parent involvement with school programs funded by AB 803 was more apparent. Over the past few years, PTA funds had been used in many of the schools we visited and called to purchase computers, software and video equipment. In several places parents were trained and served as aides in the computer program. In a rural elementary school mentioned above, for instance, only those classes with trained parent aides could use the small computer lab. Since a limited number of students could be served at any one time, someone had to be in the classroom teaching and someone in the lab assisting; without parents, this would not have been possible. In another school, a parent champion of computers and an interested PTA were instrumental in writing the AB 803 proposal, training teachers and staffing the computer lab. Parent involvement in school technology programs, however, was not universal. Some schools had little interest in parents becoming involved with the school's use of technology, other schools encouraged fund-raising by their PTA to secure additional hardware.

It wasn't a small amount of money to me, it was $9,000 . . the only other source of income at the time was my general fund money . . maybe $12,000.

Intermediate School Principal

Conclusions and Policy Context

Based on the legislative intent of AB 803 and the Department of Education's administration of it, the adoption/expansion program has succeeded. It has encouraged the planning for, adoption of, and use of technology to meet local needs in elementary and secondary schools.

What made for success? Success in the context of the AB 803 adoption/expansion grant program can be defined as *the creation of a coherent system that used technology and increased the capabilities of students and teachers*. It required a *champion*, or a group serving as the school's champion, with a *vision* of how technology might improve the instructional processes of the school. It further required *staff capability* -- either existing in a staff member, or developed through inservice efforts -- that was a catalyst in getting others at the site trained in the use of the technology. And it required a belief in *district support* -- followed by evidence in the form of dollars, statements of priorities and commitment of district personnel. While we did not see many district-initiated technology efforts, those we did see had little observable outcome at the school sites; the projects were not designed to meet specific site-level needs. Where perceived success was most evident, the ideas and the people who implemented the ideas were all from the school.

In each case, the outcomes of the adoption/expansion program are evident to the participants -- teachers and administrators who wrote, implemented, and were the beneficiaries of the grants -- but the outcomes are undocumented, unquantified, and often unquantifiable. To the outsider, especially in a system that collects data on the equipment purchased with AB 803 dollars, this program may seem like a large pool of money for hardware. Data collected for the Sunset Report indicate that more than 75% of the money was spent on hardware for computers and school television. However, beneath this surface accounting, we found that the effort to obtain and intelligently spend the money served as a stimulus to individual teachers and administrators and to committees within schools, and contributed in important ways to the school's technology program.

Without this money, most of the schools (certainly not all) would still have purchased and used computers and/or video equipment, albeit to a lesser extent. But not as many teachers would have been trained or converted to the appropriate use of technology. Not as many computer labs would exist. Fewer schools would be using video equipment. Not as many high school curriculum departments would have discovered how technology could change their instructional practices and classroom management. The introduction and adoption process for technology would have taken much longer to achieve in these schools, even in the modest way it appears to be present today.

The intent of the AB 803 program clearly focuses on local empowerment and encourages decentralized decision-making. Schools needed to make their site's technology proposal consonant with their district's technology plan, but this was a formality in most cases. The schools, themselves, were able to determine the best application of these -- and other -- funds from the district and the state that related to technology. In order to do this, schools had to clarify their goals for the program, analyze effective approaches to implementation and develop clear planning procedures. That schools began thinking seriously about the appropriate uses of technology may be one of the more significant benefits of the adoption/expansion effort.

The AB 803 adoption/expansion program was a powerful treatment in the schools, with a variety of important impacts. It empowered many teachers and administrators in schools and increased their control over the design and implementation of a program to incorporate technology in their school. In the context of policy-making and the creation of new legislation, we believe the process of good planning to be more important than increasing the number of computers in schools.

Nevertheless, its low visibility, and the schools' inability or unwillingness to collect data to affirm what they say they see, continues to limit the public awareness of this program and its impact.

Other Issues

Did this adoption/expansion program, as it was designed and implemented, promote equity? All schools had an opportunity to compete, but all schools could not compete equally well. Schools with experienced grant writers (or access to them among friends or at district offices), and schools that knew how to work the system could succeed. More than mere grantsmanship was involved. Given the fact that, through the fourth cycle more than 4,500 schools were able to create proposals and prepare applications that met established criteria, wanting to obtain an adoption/expansion grant and implement technology in the schools may have been sufficient motivation for people to strive to create a winning application. Schools with motivated people, perservering over time, could learn to prepare a well-focused proposal for submission. (Incidentally, these efforts built the capacity and confidence in several schools for staff to seek additional resources for technology and staff development programs.) Motivated schools, and the individuals or committees who prepared the application, had ideas about how to use the technology they sought. Without the vision engendered by the plan, we believe that merely using AB 803 money to buy equipment would have been a wasteful expenditure.

If the site-based, small grant program were an entitlement, requiring little or no effort on the part of schools other than filling out a simple form, then we believe we would have seen less impact on the schools and their educational programs -- and the program's low profile would continue. The need to plan, the practical requirement to involve others in the preparation of the proposal, the manageable size of the grant and the limited, though well-focused activity proposed -- all contributed to the impact of the technology program in schools.

Did larger schools, especially those in the inner city, receive sufficient resources to have an impact? If one looks at the AB 803 adoption/expansion grants as a per capita allocation of resources for technology, large schools did not fare as well as smaller ones, although both received grants. With the amount of money available through this grant program, small schools could more easily provide access to a greater proportion of their students. More access, however, based on what we have seen in schools, will not necessarily result in the greater use of technology, nor enable it to be used effectively to meet well-defined local needs. When the money was targeted to specific objectives or for a limited group of teachers or students, then size of school made little difference in perceived -- and actual -- impact.

A grant of $12,000 to a small high school with 26 teachers can have significant impact on the school's technology program. The same $12,000 to a high school science department of six teachers or to a language arts department of 10, could have, and often

did have greater impact on the instructional program than if the same dollars were used to expand the school's computer lab. A few more computers in the computer laboratory, had its impact only in the smaller schools and in the elementary school, both of which had fewer computers in the laboratory. Consequently, the addition of a few more computers resulted in a greater incremental change.

At the state and federal levels, there are few sources of funds for site-based, sharply-focused, technology activities. District funds that might be used for these purposes are under severe pressure from all aspects of the instructional program. In most instances, the experience of the schools we visited and spoke with confirmed the importance of staff development in conjunction with the acquisition and use of technology; yet funds are even more scarce for these undertakings. The AB 803 adoption/expansion grants seem to be the only resources available to many teachers for the development of technology-based instructional programs. Yet, as our experiences in the schools suggests, even in AB 803 programs, schools having to choose between limited dollars for hardware or staff development will select to purchase equipment. Whatever is purchased will be present in the school, on the books; staff development can be conducted whenever other monies are available. Staff can change, the equipment is seen as more permanent.

California's Educational Technology budget for this year only partially funds the 1987-88 adoption/expansion applications that met the criteria for funding. The Educational Technology Committee currently proposes to spend a limited proportion of the 1988-89 allocation to fund the remaining "successful" applications from this earlier round of competition, without expanding the resources available for new applications or funding any additional applications from this latest round. New legislation must address the continuing allocation of resources to meet the needs of schools otherwise unable to fund well-focused technology programs.

Recommendations:

1) The AB 803 adoption/expansion grant program has been both popular and successful; new legislation should maintain the concept of school-level grants.

After interviews with more than one hundred teachers and administrators whose intellect, affect, and actions were touched by AB 803 adoption/expansion programs, we strongly conclude that the fiscal resources of the state have been used well. In contrast to many of the grant programs in the state and federal menu, the adoption/expansion grants have encouraged the efforts of individuals who want to make a difference in the education of students at their site. This program rewards individual and small group initiative with sufficient amounts of money to make substantial changes in the way technology is used in schools. It is teacher- and site-driven and meets local needs for technology programs.

2) The school-level grant program should remain a competitive program, not an entitlement.

Much of the success of the program is due to the challenge set up to obtain funds. The administrative burdens are worthwhile; they stimulate planning energy. Within large schools, dollars for a single program rather than for distributed services made most sense; decisions about who could apply were required. Individual computer champions were able

to gain visibility in their schools and achieve a goal that advanced technology in that school. Very little happened without a champion. Most schools, or computer champions, had a vision of how they wanted to see computers used at their school site. It wasn't the district; often it wasn't the principal; it was usually a teacher who had become the advocate of technology and its importance for the students in that school.

In light of the fact that more than 2,500 schools have not received AB 803 funds, efforts must be made to encourage many of them to apply. However, monies would be wasted if allocated to schools that have no idea of how to adopt and use technology or that have no individual or group ready to take on the responsibility of the technology champion. Places without a vision for the use of technology or a willingness to plan specifically for their students and teachers, will not apply for and should not receive funds for technology programs.

3) Make the grants easier to apply for by simplifying the proposal form and its instructions.

The instructions for applying for AB 803 funds should be simplified, as should the application form itself. Department of Education staff might want to look at the FIPSE Application Overview given to prospective grantwriters to clarify the goals of the program and encourage them to write in clear English. The proposal form should indicate the vision of what can happen in that school with the resources provided by AB 803 adoption/ expansion funds. The application form should focus on the integration of technology, staff training and utilization, as well as expected outcomes.

In addition to modifications to the proposal forms, access to consultants may prove effective in stimulating strong applications. Support for better planning might be obtained through technical assistance and support from district and county offices. But this support is neither equitably nor universally available. Consequently, we recommend:

4) Over the first two years of new funding, encourage non-funded schools to make applications by supporting visits to successful schools for technology planning, and by promoting information about the school-level program to teachers and site-administrators.

Limit the effort to involve every school in the state to the two fiscal years following new authorization. By putting a cap on the period, the state will be putting the non-applicant schools on notice -- take up the opportunity, or lose it. To allocate resources reasonably, the Educational Technology Committee (or whatever new legislation might establish) should set aside 60% of the school-level grant funds (keeping the proportion of all funds allocated to this program by the Educational Technology Committee over the past several years) for schools who have not applied at all or not applied successfully. These monies should be sufficient for the yet-to-be funded schools.

Every County Office of Education should have access to a pool of matching funds to conduct planning and grant writing efforts that encourage non-applicants. Some of the funds should be used to obtain release-time and travel for school technology champions-to-be in non-funded schools to visit successful schools, including the model technology schools. These funds should be promoted to teachers and site-adminstrators to prime the pump for high quality applications. This is a form of technical support that can lead to improvements in the planning process and increased thoughtfulness about the role of technology in their schools.

The success of the AB 803 adoption/expansion program has been through the efforts of a person at the school site. The state's belief in the importance of technology in the schools requires a well-thought-out mechanism to encourage and develop technology champions at each school site. But any program that depends on Intermediate Units to administer it will show in great variations in the quality and success of the program's implementation. Nevertheless, it is a risk worth taking.

5) Require a staff development component as part of school technology plans.

Given that not all teachers and administrators are knowledgeable about computer use, program impact can only be heightened by providing staff training -- training that helps people work more effectively in their educational setting. If staff development is not part of the vision, then justification as to why it is not should be part of the application. Schools need to go beyond equipment, beyond completing the lab or setting up a departmental program, and make the use of technology flow out of instruction. It requires growth on the part of the computer champions, as well, to incorporate other people and perspectives into their world. Incentives may be necessary to bring about fuller participation within schools.

6) Encourage multiple applications from smaller units within large schools and additional, well-targeted applications from schools that have received funds in earlier rounds. Use these monies to endorse policy decisions in state technology planning.

The remaining 40% of the school-level grant funds over this two year period, and all of the school-level grant funds in succeeding years, should be available to schools that have received funds before. However, the program should encourage applications for appropriate technology projects from smaller instructional units within schools. For instance, a science department may want robotics equipment, while the English department may want video cameras and editing equipment. Both approaches to the use of technology may be valid and useful; they should not have to compete within their own school. Several projects can be funded in a large, departmentalized secondary school. Large elementary schools may also be able to justify multiple projects for various grade levels or curriculum programs. Multiple proposals from a single school also serve to encourage additional technology champions and further the goal of getting technology effectively used in schools.

Policy initiatives by the State Department of Education can influence the nature of school-level grant applications, if encouraged by the application process. Should the Department desire a productivity effort that relies on the use of satellite-delivered services to schools, school-level grant applications that seek money for satellite receive-dishes might be given priority for funds. Or consider a curriculum focus for the system of preferences. Each year, proposals that match the periodic curriculum adoption process might be favorites. Language arts might be this year's choice and proposals that call for substantial inservice activities for state partnership-funded software could be a favored category next year. Adopting successful technologies and/or procedures from the model technology schools might be the priority the year after. This school-level grants program can be used as an instrument of policy, if the program is designed to account for it.

7) Establish administrative procedures that take advantage of the cadre of computer and technology champions who have successfully applied in the past by having them become the proposal "readers" for additional funding rounds.

Presently without the administrative supporting role played by the TECCs, the Office of Educational Technology has to find a mechanism to handle the reading and rating of proposals. Regional reviews can still take place, but the readers should come from the large cadre of successful applicants who are the technology champions of their schools. Reviews of grant applications need to be made free of district politics, and no agency should review proposals from schools over which it has a direct line of control. The Office of Educational Technology can contract with county offices or districts to conduct the competitive process. Or it can follow the procedure often used by the federal Department of Education and contract the work to independent agencies. No matter, the readers should be administrators and teachers from schools, building-level people who are acknowledged as ones who have successfully implemented technology programs. The invitation to be readers of proposals is a way to acknowledge their importance and contribution to the adoption and effective use of technology in California. Travel expenses should be covered, so that rural and isolated schools are represented in the process. Honoraria, or the cost of release time, may be desirable for teachers. Training for the readers is essential; call it staff development. That funds are needed to administer this competitive program must be acknowledged by new legislation, and appropriations must include funds for this purpose.

8) Maintain the "small" grant nature of the school-level grant program to encourage the initiative of individual teachers and teaching or curriculum units within a school.

For programs in small schools, at elementary schools, and in curriculum departments of high schools, the amount of money that *was* set aside for adoption/expansion grants ($8,000-12,000) has been sufficient to stimulate activity at the building-level. Larger funds reduce the number of grants that can be made and remove some of the individual initiative and specifically local applications that small grants have had. The potential large grant may be of greater interest to the school administrator than to the head of the math department. But who is applying? And for what purpose? Furthermore, school-level grant monies should not be be large enough to impose a technology solution on a school without substantial local involvement. These funds should not be at the level of the smaller model schools efforts. With the cost of technology following a downward trend, a maximum of $24,000 might obtain a significant amount of equipment over the next several years.

If large schools require greater funding for equitable resources for building-level programs, then perhaps a separate fund should be established for this purpose. This program should not be designed to provide -- without a substantial district match -- large amounts of equipment to reduce the students/computer ratio. School-level grants are inherently leverage funds to make something happen in a school building.

9) Require both a building and a district match that will provide the maintenance, security, repair, supplies and upgrading of equipment needed to sustain a first-rate technology program in schools.

One of the problems faced by computer champions is the continuation of what has been started. The small amounts of funds for the necessities of maintenance and repair can often stymie a technology program. Where is the extra computer to use when one is in the shop? How do we get the district staff to install security locks? How do we pay for the upgrade of this word processing program we have had for the past two years? The amounts of money needed to maintain a quality program are significant. They are needed over time, not only in the first year.

Procedures are needed to sustain building and district support for technology programs. Applicants must be assured that their administrators -- whether at their site or at the district office -- are willing to support the activities initiated by the AB 803 grant. A sign-off may be sufficient, especially if future funding is contingent on living up to the initial agreement.

10) Establish evaluation procedures that make school programs publically accountable for accomplishing their goals.

Without evaluation, little is going to be known about the success, or lack thereof, of the school-level grant initiatives. If a program is not held accountable, then it must not be too important in the eyes of the funding agency. We believe that the schools that received AB 803 funding would like to tell their stories to the Department of Education and to the Legislature. Additional third-party evaluations are needed to provide an objective and professional examination. A simple mechanism that samples from among the many grant recipients would provide a regular indicator of what is being accomplished at school sites.

School-site evaluation is desirable, as well. Since it is a condition of funding, collecting data on the implementation and impact of the grant funds should be a consistent and a standard procedure. A simple end-of-year narrative would be sufficient for most programs funded under this school-level grant program. Some projects that proposed student achievement outcomes might be allocated an additional $500 or $1,000 to formally describe the implementation of the program and collect test data on their students. We believe that the schools -- and the individual computer champions -- are willing to collect and provide data as part of a small grant program. A mechanism, such as third-party contracts, is needed to systematically assess this technology program.

> *It's the best thing that ever happened to our school. I hope they will continue the AB 803 grants. I was really disappointed when I heard the legislation was cut, because the computers have really make a difference at our school. It is a small school, but for a school our size, we certainly have a computer program that we could never hope to have if it weren't for AB 803. Even though we have a staff that is really committed to spending lottery money and writing small grants, we still wouldn't have what we have here.*
>
> Elementary mathematics teacher/mentor

In conclusion . . .

New legislation may change the nature of the Educational Technology activities in the State of California. If state policy continues to be focused on developing the most appropriate and effective adoptions of technologies for instruction, then having money available to motivate and stimulate remains increasingly important. As other sources of staff development dollars are lost, as district resources are constrained, as other categorical programs are limited, the adoption/expansion approach implemented by the Office of Educational Technology under AB 803 seems valuable to meet the policy objectives of the Legislature. The above recommendations, if implemented over the next several years, can establish a structure that will increase the use of technology in schools. It will have the additional value of increasing teacher motivation and knowledge, empowering the technology champions to further the impact of technology in their schools.

Appendix I

Sample and Procedures

The Office of Educational Technology identified a sample of 37 schools, in three geographic regions that represent the variety and diversity found in California. The regions, defined as TECC service areas, are:

1) the counties served by the Sacramento TECC;
2) the Bay Area, encompassing the region served by the San Francisco, Marin, and Alameda-based TECCs; and
3) Los Angeles County.

Approximately one half of the sites were in the Los Angeles area. The sample was further defined to include schools from:

- three grade-level groupings -- elementary, middle and high schools;
- three size groupings -- small schools (less than 400 ADA), medium-size schools (400-1,000) and large schools (over 1,000); and
- three cycles of applications over three years of the adoption/expansion program implementation.

The set of issues for this research were developed in conjunction with the Office of Educational Technology. After reading sample applications for AB 803 adoption/ expansion funds, FWL researchers developed a draft instrument to guide site visits and telephone interviews. These were then pilot-tested and revised. (See Figure 1, below.)

Far West Laboratory researchers selected approximately one-half of the sample for on-site interviews with school staff (Tables 1 and 2). Information collected during these visits provided brief descriptions, snapshots, of the ways in which these schools applied the AB 803 adoption/ expansion dollars. A thematic analysis (Miles and Huberman) was undertaken with the information from the site visits. We also looked for unanticipated themes and issues and critical incidents. The remaining sites served as a verification sample, a way of ensuring that what was noted at a few sites was also likely to be found elsewhere. Researchers conducted telephone interviews with school administrators and staff at these schools to confirm and extend information that had been aggregated through the initial site visits. Both the site-visit and verification samples were selected to represent the range of demographic characteristics described above.

A review of the application forms indicate that these schools spent their AB 803 dollars in ways that match the overall spending patterns of funded California schools over the first three years of grants. While the sample is small, spending patterns do not differ greatly from the data reported in the Sunset Report. Most of the money -- almost 75% of the $400,000 these schools received -- was spent for computer equipment and furniture to house it. About 12% was devoted to software, 4% for video equipment and services and about 8% of the grant funds went for staff development.

Table 1: Sample schools by academic level and funding cycle[1]

Level \ Cycle	1	2	3	Totals
High school	4 (2)	4 (3)	4 (1)	12 (6)
Middle school	5 (2)	1 (0)	3 (1)	9 (3)
Elementary	4 (2)	6 (4)	6 (2)	16 (8)
Totals	13 (6)	11(7)	13 (4)	37 (17)

1. Number of schools visited in ( ).

Table 2: Sample schools by academic level and school size[1]

Level \ Size	Large	Medium	Small	Totals
High school	9 (4)	1 (0)	2 (2)	12 (6)
Middle school	2 (1)	3 (0)	4 (1)	9 (2)
Elementary	2 (1)	6 (5)	8 (3)	16 (9)
Totals	13 (6)	10 (5)	14 (6)	37 (17)

1. Number of schools visited in ( ).

This study used qualitative methods to gather information reliably and validly, identify the salient issues, explore them with staff at the school sites, and confirm them. The sites were not selected -- nor was the methodology appropriate -- to provide a statistical representation of all schools in California. Nor was this research designed to provide numerical data on the overall application and impact of adoption/expansion grants. Researchers developed rich, illustrative descriptions of school programs that received and implemented technology activities with funds from AB 803. These were compared with one another and common themes were identified. Some of these themes served as answers to the research questions posed earlier. Others represented unexpected findings. The qualitative methods used in this study provide depth of understanding at relatively low cost.

A list of the research issues may be found in Figure 1, below.

Figure 1: School Interview Format

- School Context
  - Geographic location
  - Appearance, Layout
  - Ambiance
  - Appearance, Manner, Self-presentation of interviewee(s)

- Preparation of Adoption/Expansion Grant
  - Who was involved? Extent of school involvement?
  - Whose vision? Whose leadership? Whose technical competence?
  - What was the process of preparing the grant? How long did it take?
  - Did the proposers rely on help from TECC?
  - General reactions to the proposal process?
  - Confusions or problems?
  - Suggestions for revision of application process.

- Politics of Grant Preparation
  - Level of staff knowledge before/after?
  - Deviations from proposal? (Why?)
  - Time from receipt of money to implementation?
  - Problems encountered? Security/maintenance/installation?
  - Hardware/software coherence? Problems in selection/utilization?

- Program Impacts
  - On students?
  - On faculty actions and attitudes?
  - Other impacts?
  - What evaluation has been conducted? Information available? What is reasonable expectation for evaluation activity?

- Program Leverage
  - Relationship of AB 803 dollars to technology or staff development funded through other sources.
  - Business and industry support.

- Technology in School Prior to AB 803
  - Used by whom?
  - For what purpose?
  - Previous inservice on technology?

- Apply again?
  - Was the amount of money worth the trouble?
  - Changes desired in the proposal preparation process?
  - Advice to others re: application process?

- Important ideas, conclusions, issues, etc.?

Appendix II

Stories from the Field:

How Schools use Technology and the AB 803 Grants

The following brief vignettes reflect many of our visits to schools and our discussions with school administrators and teachers. We have attempted to provide a feel for what is being done with technology in California schools. The schools we saw seem representative of schools throughout the state and the range of activities they undertook are only a sampling of what is being done with technology. The names of respondents have been changed and certain characteristics of the locations and events have been modified to maintain the privacy of those with whom we talked. The writers, not the respondents, are responsible for any inaccuracies that might have entered into this document.

Country Middle School

This 500 student, middle school is located not far from the northern California coast and was constructed with lots of redwood during the '30s. Most of the students are bussed to this "country school" from the surrounding small towns and isolated homesites. The thirty teachers working at Country Middle* enjoy living in a small town environment, but they must go out of their way to find help -- the TECC was a four-hour drive, each way. However, a letter from the TECC alerted John, a teacher who now also serves as computer coordinator, about the AB 803 program. The principal "saw the handwriting on the wall" about computers and permitted John to pursue the AB 803 grant on school time.

This teacher, who had never written a "real grant" before, found the process "horrendous." He stayed up all night alone several times, revising and shortening a rough draft which was twice as long as required. He spent at least 50 hours writing. The district's curriculum coordinator was consulted by phone, but otherwise John wrote alone. When the TECC offered a one-day proposal review session, he went and found them helpful. "The toughest part was coming up with the objectives." The TECC guidelines helped, as did any feedback he could get at the draft stage.

John had written about computers before. He had been a computer mentor teacher and had drafted the district's computer literacy plan "with 60 or 70 recommendations, most of which were never followed up. I think they threw it away." He had set up a computer-use committee, at that time, with six teachers each planning the programs for their specific departments. His job was to conduct the inservice training for the committee and they, in turn, were to go back at train their department. Then, about 20% of the teachers began to use computers, especially gradebook programs. However, there came a change in administration at the district and at the building, as well as a transition from a junior high to a middle school, and many of the ninth grade teachers left. These had been his core of users, even when the school administration didn't support the use of technology. John

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was discouraged. "It's tough to get them interested in computers when they don't even type."

John is still a resolute champion for technology. He has taken computer classes at just about every TECC and institution of higher education from the College of the Redwoods down to San Francisco State. He is responsible for installation and maintenance of the school's equipment. He makes sure all sixth graders develop keyboarding skills, even though many of their teachers in succeeding classes never let them use these capabilities. He sees that, for most teachers, there isn't sufficient motivation to use computers, especially because he doesn't have the money to acquire software that would be useful to them.

Nevertheless, the equipment purchased with AB 803 funds are being used by several teachers in the science, social studies and English departments. Some of the computer programs distributed by the state under the Technology in the Curriculum (TIC) project are staples for these teachers. Some days John seems burned out as a teacher and as a proponent of technology. He has to work too hard to get people to use what they have access to. On other days, he is the technology enthusiast, think about writing other grants, but he doesn't know where to get more money.

Agribusiness High School

The large high school in this agribusiness community has been divided into specialty units to match its segmented architecture from the early seventies. This modern school, and the athletic facilities associated with it, are a center of civic pride; boosters have provided time and money to it. There are three units within the school, each with a different emphasis, and the business education unit is headed by a real computer enthusiast. Jacob* -- as well as other administrators and secretaries -- have computers on their desks, all interconnected to the central file server. The model career-vocational education preparation program he has developed in this unit was designed to prepare every student to make career choices and develop employability skills. Even before they received their AB 803 grant, Agribusiness High School had been using computers in various classes and laboratories.

Because Jacob encourages the use of computers as much as he does (and he had purchased his first in 1977), all of the teachers in the unit had received training. He started them off with gradebook programs and then tried to hook them into applications that matched with their curriculum. Teachers with an interest in computers were given the opportunity to develop their technology-based, curriculum programs. And Jacob found a real ally in Al.

Al, who taught business and computer classes (and served as assistant football coach) was an early convert and began to take additional computer courses at the nearby university. He and Jacob were soon looking for every resource to acquire equipment that would extend their programs. When AB 803 adoption/expansion grants were announced, Jacob and Al jumped at the opportunity and immediately prepared an application to expand their business unit laboratory. They lost on the first two rounds and changed their initial

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proposal to develop a program that would have the Language Arts department expand their use of computers. This time they obtained a higher score and received the grant.

Abby, a Language Arts teacher who worked on all three applications, enthusiastically describes working with her class of ESL students in the AB 803 program last year. "When the computers first got here I sent them [the students] in groups of three or four to the computer room to work on writing resumés and learn word processing at the same time. When they finished, I told the best one to teach another three. . . and before you knew it, all of them had learned." She went on to say that "when they saw what they had written, they were extremely proud." Their work was neat and accurate. Abby's ESL students also started keeping journals on the computer and using it for various kinds of language tasks. Abby said that these students received higher scores on the ESL language proficiency tests that year and she attributed the gain to the program initiated with AB 803 funds.

The English department, after a taste of success with the AB 803 computers, had recently ordered enough of their own computers to establish a departmental computer lab. But, during the time it took to set up a laboratory room, the computers were placed one or two to a room and the teachers now refuse to give up "their" classroom computers. The department is now planning to use the new computer lab being set up in the library; in-class computers will remain where they are.

Al was pleased to get the money, and he feels he "got more for the dollars, since the costs went down over time." But he -- and some of the Language Arts teachers were frustrated by the application process. Every time they thought they had their ideas focused, a TECC representative or a district staffer would review the application and ask for changes. They wanted a way "to express their ideas flexibly," but the only way they could get the proposal funded "was to be very specific." They knew they had a very good, ongoing program using technology in the curriculum, and they wanted the flexibility to try out some other ideas without being tied down. But now he is looking for additional money -- money that will continue the activities started with 803, 551, CTIIP, SIP, and other funding programs he and Jacob have tapped.

Formerly Rural Elementary

In a small elementary school outside of Los Angeles, in one of the faster growing formerly-rural-now-suburban communities, the enthusiasm of a single teacher crystallized interest in technology. Maggie* was incredibly motivated and hard-working according to her principal. She was involved in a summer workshop in technology and found out about AB 803 there. Helped by a district staff developer, Maggie and Sara, another teacher, spent long hours -- reimbursed by the district -- preparing a model proposal. Both the district and the Board were very supportive of their efforts.

Prior to winning an 803 grant, Formerly Rural Elementary School* did have a few computers and many of the teachers used them for occasionally for simulations, problem solving and other enrichment activities. The AB 803 grant was to provide some structure

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to the program and improve math instruction. Maggie and Sara prepared an inservice manual and conducted six hours of training even before the new computers arrived. The school provided funds for substitutes. Everything happened very quickly. "The money was received in October, the inservice was in November, and the computers were in the classroom by January."

Now the school has a computer in every classroom and two in each 4th, 5th, and 6th grade room. These upper grades use the computers up to four hours per day with the students signing up on a schedule posted above the computer. The schedule also indicates how much of the assignment has been completed by each student working on the computer materials. The AB 803 program focused on math word problems and the software they purchased two years ago continues to be used. The evaluation they conducted using CAP and CTBS scores showed only a 2-3% increase. Several teachers feel that the low increase was result of poor software and that the potential of the computer to improve scores has not been tapped.

While test scores have not been as good as they would have liked, the effort to seek and implement the AB 803 grant is perceived as well worth it. The grant application from Formerly Rural Elementary School was replicated for the other five elementary schools in the district and they obtained $40,000 from AB 803. It was "an infusion of funds we wouldn't otherwise have gotten and the computer programs would have not progressed." They do advise others who want to apply that the application should reflect the "'in' things and 'in' language" that the readers want.

Maggie's enthusiasm was the impetus to get the school organized and moving in the computer arena. After her departure, other teachers seem to have taken her devotion as their own. It appears that this school's staff and administration have invested their time and their committment to make the computer program a success. It is important to them.

Sierra Elementary

Given the beauty of the hills and the trees, it is no wonder that this school is growing quickly as more people consider living here and putting up with a longer commute to the city. The school now has almost 750 in grades K-4 and a half-dozen temporary classrooms been put up at the edge of the playground. But even with this crowding, the teachers must like it here as well, since the turnover rate is under ten percent a year. The school receives a great deal of parent support and the recent loss of state funds have meant that parent volunteers are now replacing the many paid aides that have worked in almost every classroom.

The former principal worked early on with one or two teachers to develop a computer program in the school, but with limited funds, they could only advance a short distance. The old equipment was soon falling into disrepair and some machines were scavenged for parts so that others could continue to be used. The announcement of AB 803 adoption/expansion grants was a sign to these computer champions and a "catalyst for action" -- now they could get the district to invest in the technology program with matching funds.

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They organized parent groups, got the board interested, but the effort lacked teacher input. They then modified the plan to provide teachers with computers to learn on before they were aggregated for a computer lab. The organizers of the AB 803 application were also drafted to write the district plan, so they had strong ideas about what they wanted to accomplish. They also felt that their application stood a better chance of getting funded if the district watch was significantly greater than the minimum required by the state. [There is no evidence that this belief is accurate.] They were able to persuade the board to match about 2 1/2 to 1 with the state and received, as a result, enough money to put in a thirteen computer lab, and then hired a full-time lab coordinator with other categorical funds.

The computer lab has been used as part of a pull-out program to increase the students' basic skills. Groups of students, accompanied by the aide would go to the lab room -- crowded into an alcove. There, the computer coordinator would have them load up programs for language arts or mathematics or spelling and get to work. Her assignments were coordinated with the teacher through the teacher aide. Everyone had been pleased with this arrangement until this year, when budget reductions reduced the availability of aides and caused the loss of the computer coordinator. Without either aides or a computer lab teacher, there is no easy way to use the lab since only half a class can fit in it.

For many teachers the solution was to involve parents in the program. Each classroom teacher tried to get parents to serve as classroom aides for a least one day a week. Those who volunteered were given training on the computers and now serve as their classes computer lab instructor. They lead the group to the lab and follow the curriculum instructions given by the teacher as they hand out programs to be loaded up by their students.

Not everyone is using the computer lab this year, not always because they cannot obtain parents to help; some teachers just are not interested. But many are, and use the computer lab and individual computers spread out in individual classrooms throughout the school. Teachers report using them for gradebook programs, worksheets, and for letters home to parents. Some of these computers were purchased with lottery money.

Teachers who originally worked on the AB 803 proposal have remained committed. "It helps the students learn facts, and for remediation, it can't be beat." One fourth grade teacher insists that his students learn to keyboard at least 20 words per minute before they go on to the next school. (One student enjoyed typing more than piano lessons, so her parents bought her a computer and she is now [October] at 40 wpm.) He also has his class prepare a newspaper on computer and sends it home to parents. He is now pushing the middle school to take advantage of what he is teaching his students. He reported that "Parents now go to the junior high and ask where the computers are."

Another teacher, in the third grade, has a computer assigned to a deaf student and makes numerous assignments for him on it. He reports increased that his student pays more attention to the work and spends more time on task. "Without 803 there would be no lab and much less interest in technology. We doubled the number of computers with the 803 grant."

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Plum High School

"When you want something to happen, you just go ahead and try for it," said Ray*, the industrial arts teacher at a large high school. He wanted his students to experience computer-assisted drafting. So after hearing about the AB 803 program from the school librarian and from a district administrator who handles grants, he went ahead and tried for it.

Plum High School is over-crowded. Built in 1960 for about 1,500 students, it now contains about 2,400, and 12 portable classrooms have been added to the school ground. The school contains "a large spectrum" of races, cultures and socioeconomic groups from the agricultural community it serves. It is one of two high schools in the district.

Ray, and some of the other industrial arts teachers, are independent people and willing to tackle any job they want to accomplish. It was "not a problem" for Ray to write the proposal, identify and order the equipment and software he wanted, and singlehandedly implement the computer-assisted drafting program. He did have someone at the TECC read over his proposal and found her suggestions helpful. And he did have to go down to the district office to get the district plan, since he had difficulty "nailing them down and getting the stuff sent out." Ray guesses he spent about 40 hours on the whole thing.

The AB 803 funds were approved in June, equipment was ordered in September, and the program was in place in October. The grant was for computers and software for the industrial arts program only. While Ray has invited some of the business teachers and counselors to bring their classes to look at the computer-assisted drafting project, "the grant money doesn't affect other departments. It is a narrow-focused project. I didn't expect people to flock to use the CAD system; I'm one of two drafting teachers in the district." But, other uses for computers can be found in the industrial arts program. Ray and one other industrial arts teacher use computers extensively for instructional activities. Four of the five industrial arts teachers and many of the students in the program "use some student-written software to figure out board footage, how to center drawings, billing . . ."

Ray says that the application process was "not as bad as some he's done . . . and the federal ones were just terrible." There were some minor problems, nevertheless. "Security is O.K. -- we have a silent alarm system -- but our biggest problem is maintenance . . . it's a district-wide problem . . . there is no maintenance with anyone."

Ray has taken three or four classes in computer programming and computer-assisted design at a combination of university courses, TECC and district workshops. "Found it pretty easy to pick up." As a result of receiving the AB 803 grant, Ray and a metal shop teacher sought and received a Lottery grant of $5,000 to start-up a computer-assisted manufacturing (CAM) program.

"Students are using current technology -- what business and industry are using. They get hands-on experience instead of just watching A-V stuff. And the students enjoy using it; they have produced some excellent work. CAD is a simple program to learn, it doesn't scare students off -- and the quality of workmanship has improved. Students are tackling harder problems and their knowledge of terminology has greatly increased. We are going to try some new approaches in the coming year and our students will get community college credit for the work they are doing."

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